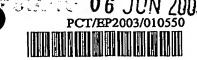
PATENT COOPERATION TREATY



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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

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| anslation interna- | TIONAL PRELIMINARY EXAMINA | ATION REPORT | |
| | (PCT Article 36 and Rule 70) | | |
| Applicant's or agent's file reference L 1 P 18 WO | FOR FURTHER ACTION See Notific Preliminary | THER ACTION See Notification of Transmittal of Internati | |
| International application No. | International filing date (day/month/year) | Priority date (day/month/year) | |
| PCT/EP2003/010550 | 23 September 2003 (23.09.2003) | 07 December 2002 (07.12.20 | |
| International Patent Classification (IPC) of C11C 3/00 | or national classification and IPC | | |
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| Applicant | LURGI AG | • | |
| amended and are the basi 70.16 and Section 607 of These annexes consist of 3. This report contains indications I Basis of the rep II Priority III Non-establishm | ort ent of opinion with regard to novelty, inventive s f invention | tep and industrial applicability | |
| VI Certain docume | ment under Article 35(2) with regard to novelty, in the international application ations on the international application | nventive step or industrial applicability | |
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

International application No.

PCT/EP2003/010550

| L Basis | of the re | port | | | | | |
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| 1. With regard to the elements of the international application:* | | | | | | | |
| \boxtimes | the international application as originally filed | | | | | | |
| \boxtimes | the desc | ription: | İ | | | | |
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| | pages | 1-3, filed with the letter of | 21 October 2004 (21.10.2004) | | | | |
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| in th and | This re beyond lacement his report 70.17). | the description, pages the claims, Nos the drawings, sheets/fig port has been established as if (some of) the amendments had not been made, so the disclosure as filed, as indicated in the Supplemental Box (Rule 70.2(c)).** sheets which have been furnished to the receiving Office in response to an invite as "originally filed" and are not annexed to this report since they do not the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 1 and annexed to the sheet containing such amendments must be referred to under item 2 and 3 | tation under Article 14 are referred to not contain amendments (Rule 70.16 | | | | |
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INTERNATIONAL PRELIMINARY EXAMINATION REPORT

| Intern. al | application No. |
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| PCT/EP | 03/10550 |

NO

YES

NO

1-3

1-3

| v. | citations and explanations supp | orting such statement | inventive step or industrial app | | |
|----|---------------------------------|-----------------------|----------------------------------|-----|--|
| 1 | Statement | | | | |
| | Novelty (N) | Claims | 1-3 | YES | |
| | | Claims | | NO | |
| | Inventive step (TS) | Claims | | YES | |

2. Citations and explanations

Industrial applicability (IA)

Reference is made to the following document:

Claims

Claims

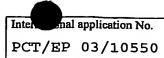
Claims

D1: EP-A-0 249 463 (BIO ENERGY TECHNOLOGY LTD)
16 December 1987 (1987-12-16)

1. Novelty and inventive step of independent claim 1

- 1.1 D1 is considered to be the prior art closest to the subject matter of claim 1. Said document discloses (see claim 1; figure 1; column 2, last paragraph; column 4, paragraphs 2-6; and example 1) a method for the intensive aftertreatment of biodiesel with the following steps: crude methyl ester is formed by transesterification of a vegetable fat or animal fat with methanol, the crude methyl ester thus formed undergoes intensive aftertreatment with a strong acid at room temperature (the mixture may also be heated to at least about 60°C), the ester layer separated from the emulsion thus formed is thoroughly washed with water and then dried.
- 1.2 The subject matter of claim 1 therefore differs from the known method in that a fine emulsion is produced from the ester phase and from the acid phase in a mechanical intensive mixer.

INTERNATIONAL PRELIMINARY EXAMINATION REPORT



- 1.3 The applicant's arguments in the letter dated 21 October 2004 have been considered. They underline the difference between the D1 process and the process in the application. However, no technical effect arising from this difference is disclosed.
- 1.4 The subject matter of the claim does not therefore involve an inventive step (PCT Article 33(3)).

2. Dependent claims

- 2.1 D1 discloses the subject matter of dependent claims 2-3, which cannot therefore be regarded as inventive (PCT Article 33(3)) (see the following specific references for the claims indicated):
- example 1 of D1 for the present claim 2
- column 4, third paragraph, of D1 for the present claim 3.



CLAIMS

- 1. A method for improvement of the long term stability of biodiesel, characterized in that the crude methyl ester produced by transesterification of a vegetable or animal fat or oil with methanol, is treated intensively with a strong acid or with a mixture of a strong acid and a complex former and the ester layer separated from the emulsion formed thereby is subjected to a thorough water washing and subsequently dried.
- 2. The method according to Claim 1, characterized in that the after-treatment of biodiesel with a strong acid or with a mixture of a strong acid and a complex former is carried out at a temperature between 25 and 60 $^{\circ}$ C.
- 3. The method according to Claims 1 and 2, characterized in that the treatment of biodiesel is carried out in a mechanically intensive mixer.
- 4. The method according to Claims 1 through 3, characterized in that as strong acid hydrochloric acid, sulfuric acid, p-toluenesulfonic acid or phosphoric acid are employed and as complex former EDTA or citric acid.
- 5. The method according to Claims 1 through 4, characterized in that the water wash of biodiesel is carried out in a wash column according to the counter current principle or by means of a mechanically intensive mixer.

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5 Neue Patentansprüche

JC20 Rec'd PCT/PTO 06 JUN 2005

- 10 1. Verfahren zur Verbesserung der Langzeitstabilität von Biodiesel, wobei
 - 1.1 durch Umesterung eines pflanzlichen oder tierischen Fettes oder Öles mit Methanol Rohmethylester gebildet wird,
- 1.2 der so gebildete Rohmethylester mit einer starken Säure oder mit einer Mischung aus einer starken Säure und einem Komplexbildner bei Temperaturen zwischen 25 und 60°C intensiv nachbehandelt wird,

20 dadurch gekennzeichnet, dass

- 1.3 in einem mechanischen Intensiv-Vermischer aus der Ester- und aus der Säurephase eine Feinemulsion hergestellt wird,
- 25 1.4 die aus der dabei gebildeten Emulsion abgetrennte Esterschicht einer gründlichen Wasserwäsche unterworfen und anschließend getrocknet wird.
- Verfahren nach Anspruch 1, dadurch gekennzeichnet, dass als starke
 Säure Salzsäure, Schwefelsäure, p-Toluolsulfonsäure oder Phosphorsäure und als Komplexbildner EDTA oder Zitronensäure eingesetzt werden.
 - 3. Verfahren nach den Ansprüchen 1 bis 2, dadurch gekennzeichnet, dass die Wasserwäsche des Biodiesels in einer Waschkolonne nach dem Gegenstromprinzip oder mittels eines mechanischen Intensiv-Vermischers erfolgt.

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Original Version of the Patent Application